**Dolly Was Lucky: Scientists warn that cloning is too dangerous for people**

**By John Travis,** [*Science News*](http://www.sciencenews.org/)

1 March 1997: As scientists consider whether human cloning can be safe, the stories of two sheep, one famous and one dead, illustrate the dream and the danger.

One tale centers on the photogenic Dolly, the first animal ever cloned from an adult mammalian cell. While investigators continue to study the 5-year-old sheep for late-developing abnormalities, such as premature aging, Dolly has given birth to normal lambs and is by all accounts healthy. She may be a bit overweight, but that's because reporters have fed her so much, jokes Alan Colman of PPL Therapeutics in Edinburgh, Scotland, which funded the creation of Dolly.

Less well known and lacking a cute public name was a cloned ewe born not too long after Dolly. It had no obvious physical abnormalities at birth and was an active lamb, but it panted all the time, recalls Ian Wilmut of the Roslin Institute in Edinburgh, whose group cloned both Dolly and the second ewe. The respiratory problem was so severe that researchers within a few weeks decided to euthanize the hyperventilating animal. An autopsy showed that its lungs had not developed properly.

Wilmut says that this second ewe's fate ought to make those who would clone people think again. "Who would be responsible for a child born with an abnormality like that?" he asks.

Although Dolly's birth has inspired a few maverick researchers to want to make human cloning a reality, the often-disastrous results of animal cloning have convinced many scientists that an effort to clone a person is unthinkable at this time.

In August, a scientific and frequently emotional discussion on the feasibility of human cloning played out in public at the National Academy of Sciences (NAS) in Washington, D.C. Before a panel considering whether to recommend a ban on human cloning, more than a dozen scientists described their successes and failures at cloning mice, sheep, goats, and cows. As they discussed possible explanations for what goes wrong, the scientists often focused on evidence of abnormal gene activity during clones' development. And almost all concluded that cloning a person would be unsafe.

But not everyone did. Three proponents of human cloning defended their plans and vowed to continue. They argued that scientists have more knowledge about reproduction in people than in most other species, and people may not be susceptible to some of the problems that have arisen in cloned animals.

"We need to proceed with human cloning," says Brigitte Boisselier, a chemist and director of a cloning company formerly called Clonaid, whose location she refuses to reveal. "I believe it's a fundamental right to reproduce the way you want."

Despite its failure rate, the cloning process is straightforward. First, investigators obtain an egg cell from an animal and remove its nucleus, the sac containing almost all the egg's DNA. They replace that nucleus with one from a cell of the animal they wish to copy. Usually, this is done by fusing the nucleus-lacking egg with the donor cell.

Finally, a jolt of electricity or some other stimulus tricks the egg into dividing as if it had been fertilized by a sperm. Once the growing embryo has reached a multicell stage known as a blastocyst, it's ready to be transferred into the uterus of a surrogate mother.

Jonathan Hill of Cornell University, who has cloned cattle, notes that about one-third of the cloned embryos that are implanted don't survive even the first month of a cow's normal 9-month gestation period. Of those that do, another half die in the next month or two, apparently because of abnormal placental development. This prenatal die-off continues through birth.

"The placenta is not supplying nutrients, and the fetus starves," says Hill.

The same pattern of spontaneous abortions holds true for cloning in other species. "The losses are extraordinarily large and happen at all stages of gestation," says Colman.

Making it to birth is no guarantee that a clone will survive. Hill notes that newborn cloned calves frequently emerge in bad shape. Some have skeletal abnormalities. Many suffer a variety of lung and heart problems.

Hill estimates that 25 to 50 percent of clones are oxygen-deprived at birth. Some can be saved, but many die.

Cloned cows, sheep, goats, and mice also often display what scientists call large-offspring syndrome. Internal organs, limbs, and overall body are over-sized, and the newborns are sickly. The large fetuses can also place a mother at risk during delivery.

The desire to guarantee that a human clone be healthy may reflect a philosophical difference between people favoring and opposing attempts at human cloning. Pointing to the high rates of spontaneous abortions and birth defects that plague natural pregnancies, Zavos argues that human reproduction is intrinsically risky.

Of course, more than safety arguments enter discussions of human cloning. Some people object to cloning out of religious, ethical, or moral principles.

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| Friday, 14 February, 2003, 20:28 GMT  **Dolly the sheep clone dies young**  Dolly  Dolly the Sheep was born in 1996  Dolly the sheep, who became famous as the first mammal to be cloned from an adult cell, has died.  The news was confirmed on Friday by the Roslin Institute, the Scottish research centre which created her.  A decision was taken to "euthanase" six-year-old Dolly after a veterinary examination showed that she had a progressive lung disease, the institute said in a statement.   |  | | --- | | http://news.bbc.co.uk/furniture/new_quote_left.gifShe was not old - by sheep standards - to have been put down http://news.bbc.co.uk/furniture/new_quote_right.gif    Dr Patrick Dixon, expert on ethics of human cloning |   Dolly became the first mammal clone when she was born on 5 July 1996.  She was revealed to the public the following year.  **Post-mortem**  Dr Harry Griffin, from the institute, said: "Sheep can live to 11 or 12 years of age and lung infections are common in older sheep, particularly those housed inside.  "A full post-mortem is being conducted and we will report any significant findings"  Dolly was a sheep created totally by design - even her name was picked specifically to be appealing.  It came about during the latter stages of labour when Dolly was born.  Stockmen involved in the delivery thought of the fact that the cell used came from a mammary gland and arrived at Dolly Parton, the country and western singer.  **Cloning row**  Her birth was only announced seven months later and was heralded as one of the most significant scientific breakthroughs of the decade.  But it also prompted a long-running argument over the ethics of cloning, reaching further levels with the latest allegations of human cloning.   |  | | --- | | Dolly and her baby Bonnie  Dolly gave birth to four lambs in her lifetime |   Dolly, a Finn Dorset, bred normally on two occasions with a Welsh mountain ram called David.  She first gave birth to Bonnie in April 1998 and then to three more lambs in 1999.  But in January last year her condition caused concern when she was diagnosed with a form of arthritis.  **Museum piece**  The condition would usually be expected in older animals and another debate erupted over what could properly be judged as Dolly's true age, and the risks of premature ageing in clones.  Professor Ian Wilmut, who led the team that created her, said at the time that the arthritis showed their cloning techniques were "inefficient" and needed more work.  Dr Patrick Dixon, a writer on the ethics of human cloning, said the nature of Dolly's death would have a huge impact on possibility of producing a cloned human baby.   |  | | --- | | http://news.bbc.co.uk/furniture/new_quote_left.gifIf there is a link, it will provide further evidence of the dangers inherent in reproductive cloning http://news.bbc.co.uk/furniture/new_quote_right.gif    Professor Richard Gardner |   He said: "The real issue is what Dolly died from, and whether it was linked to premature ageing," he said.  "She was not old - by sheep standards - to have been put down."  **'Profound effects'**  Speaking to BBC News 24 on Friday, Prof Wilmut said Dolly's birth should be the important issue.  "The fact that we were able to produce an animal from the cell of another adult - it had profound effects on biological research and in medicine."  Professor Richard Gardner, chair of the Royal Society working group on stem cell research and therapeutic cloning, said: "We must await the results of the post-mortem on Dolly in order to assess whether her relatively premature death was in any way connected with the fact that she was a clone.  "If there is a link, it will provide further evidence of the dangers inherent in reproductive cloning and the irresponsibility of anybody who is trying to extend such work to humans."  Dolly has been promised to the National Museum of Scotland and will be put on display in Edinburgh in due course. | http://newsimg.bbc.co.uk/shared/img/o.gif | |  |  |  |  | | --- | --- | --- | --- | | http://newsimg.bbc.co.uk/shared/img/o.gif | http://newsimg.bbc.co.uk/shared/img/o.gif | http://newsimg.bbc.co.uk/shared/img/o.gif | http://newsimg.bbc.co.uk/shared/img/o.gif | |

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**Pros and Cons of Cloning**

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Contrary to popular notion, cloning started more than a century before Dolly, the first cloned mammal, became famous. It cannot be denied, nonetheless, that Dolly awakened the imagination of the populace regarding the pros and cons of cloning. It is a debate that continues to polarize society 15 years after the birth of the most famous sheep on Earth.

**Inclusions in the Discussion**

We must emphasize that the cloning referred to in this article refers to reproductive, gene and therapeutic cloning. Reproductive cloning is used in the creation of an animal with the same nuclear DNA as another animal, the latter of which may be currently or previously in existence. This was the technology used in the creation of Dolly.

Therapeutic cloning refers to the production of human embryos for the purpose of research. It has also been applied to create new organs or tissues for transplantation into a waiting patient with possible applications in the treatment of diseases like diabetes, Alzheimer’s disease and even cancer.

These two types of cloning – there is a third type known as gene cloning, by the way – are at the center of heated debates. If you wish to cast your vote on the pros and cons of cloning, it is important to acquire as much reliable and relevant information and education on the matter.

**Advantages of Cloning**

With that being said, the following are the generally accepted benefits of cloning:

• Easy replacement of internal organs and tissues for patients in need of transplants instead of waiting for suitable organ donors, alive or dead. Since the transplanted organ contains most of the recipient’s genes, there is a lesser chance for rejection as well.  
• Cloning can be a solution to the infertility issue among couples. Theoretically speaking, parents can choose the desirable qualities in their genes to be passed on to their children.  
• Genetic research can immensely benefit from cloning especially in combating the wide range of genetic diseases.

Tipping the balance in the pros and cons of cloning is the fact the gene cloning can be harnessed to produce superior plants and animals to feed humanity. Genetic engineering has made great advances in this regard although it is also polarizing.

**Disadvantages of Cloning**

Of course, there are disadvantages to cloning that prevent the advances in this area to be made. Such disadvantages include:

• Genetic diversity and its benefits are weakened with the replicating process in cloning. We may be exposing ourselves to a compromised ability to adapt to our surroundings, not to mention that the beauty of diversity is lost.  
• Unethical practices can result from cloning as unscrupulous individuals can breed individuals with certain traits.

Probably the most contentious issue in the debate about the pros and cons of cloning is the ethical side of the process. Is it ethical to act like God by creating an embryo that develops into a human being? Is it ethical to kill a pre-embryo in order to harvest its stem cells, which will then be cultivated into an organ for transplant purposes? Is it ethical to mess around with nature in the first place?

Indeed, if you must take sides in the pros and cons of cloning debate, your main responsibility is to enter it with an open, educated and informed mind first and stable emotions second.

# Pros And Cons Of Cloning

http://lifestyle.iloveindia.com/lounge/pros-and-cons-of-cloning-6972.html

When the first cloned sheep, Dolly, hit the news, most eyes popped-out in sheer disbelief.  Decades back, cloning was only discussed in scientific circles and no one ever imagined that it would soon become a reality. In simple terms, cloning can be understood as production of genetic copies which can develop genetically identical human organisms. A cloned organism, or group of organisms, is composed or cloned using the exact genetic material as the original organism(s). Ever since cloning became a possibility, its pros and cons have been fervently debated over on moral, ethical and technical grounds. In case you want to know the possible advantages and disadvantages of cloning, follow the article.

**Advantages & Disadvantages Of Cloning**

**Cloning Pros**

* Cloning body parts can become a life-saver. The vital organs of human body can be cloned and used as back-up in case of an organ failure. When a crucial body organ such as kidney or heart fails to perform its normal functions, it can be replaced with a cloned organ substitute.
* Cloning can also provide a viable solution to infertility in human beings. It can help the infertile individuals in producing children. Cloned embryos can be planted into women’s bodies to produce babies. Also, cloning can make it possible to reproduce a certain desirable trait in human beings through the cloned embryo.
* Technologies used in cloning can also serve a useful purpose for the researchers in genetics. Cloning technologies may help to understand the composition of genes and their effect on human traits and behavior in a more comprehensive and elaborate manner. Cloning can also make it possible to alter genetic constituents in cloned humans, so as to simplify their analysis of genes. A wide range of genetic diseases can be averted through cloning.
* Genetic alteration of plants and animals can also be enabled by cloning. It can also help to replicate animals that can be used for research purposes by scientists.

**Cloning Cons**

* Since cloning creates identical genes and it is a process of replicating a complete genetic constitution, it can significantly hamper the much needed DNA diversity in human beings. The lessening of genes diversity will weaken our adaptation ability. Similarly, cloning will also severely affect diversity in plants and animals. A cloned species may not know how to react to viruses and other destructive agents as scientists cannot predict such potential developments.
* By allowing man to interfere with genetics in human beings, cloning raises a concerning probability of deliberate reproduction of undesirable traits in human beings, if so desired. Cloning of body organs opens the possibility of malpractices in medical fraternity.
* Technical and economic barriers need a consideration in cloning human organs for transplant. Cloned organs may not be cost-effective for a good part of human society. The benefits of cloning techniques reaching the common man remain a big question mark.
* On the moral and ethical front as well, cloning raises several serious questions. It devalues man-kind, as a new birth is a natural process, and seriously undermines the value of human life.